

CLAIMS

1. A method of cleaning a substrate processing apparatus comprising a processing container defined by an outer wall, a holding stage connected to a high-frequency power supply and provided in said processing container for holding a processing substrate, an exhaust port for evacuating the inside of said processing container, a microwave transmissive window provided on said processing container as part of said outer wall so as to face said processing substrate, a microwave antenna provided on said microwave transmissive window and electrically connected to a microwave power supply, a plasma gas supply portion for supplying a plasma gas into said processing container, and a process gas supply portion provided between said processing substrate on said holding stage and said microwave transmissive window so as to face said processing substrate, said method comprising:
- 15 a gas introducing step of introducing a cleaning gas into said processing container,
- a plasma exciting step of introducing a microwave into said processing container from said microwave antenna to thereby excite a plasma in said processing container, and
- 20 a bias applying step of applying a high-frequency power to said holding stage from said high-frequency power supply.
2. The method according to claim 1, wherein said process gas supply portion is made of a conductive material and grounded.
3. The method according to claim 1 or 2, wherein said microwave antenna is power-fed through a coaxial waveguide and comprises an antenna body having an opening portion, a microwave radiating surface having a plurality of slots and provided on said antenna body so as to cover said opening portion, and a dielectric provided between said antenna body and said
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microwave radiating surface.

4. The method according to any one of claims 1 to 3, wherein said cleaning gas contains oxygen.

5 5. The method according to any one of claims 1 to 4, wherein said cleaning gas contains hydrogen.

6. The method according to any one of claims 1 to 5, wherein said cleaning gas contains H₂O.

7. The method according to any one of claims 1 to 6, wherein said cleaning gas contains a fluorine compound.

10 8. The method according to any one of claims 1 to 7, wherein said cleaning gas is introduced from said plasma gas supply portion provided between said microwave antenna and said process gas supply portion.

9. The method according to any one of claims 1 to 8, wherein said cleaning gas is introduced from said process gas supply portion.

15 10. The method according to any one of claims 1 to 9, wherein said cleaning gas is dissociated by said microwave plasma and a high-frequency plasma excited by said high-frequency power so as to be reactive species, and a deposit deposited inside said processing container is etched by said reactive species so as to be removed.

20 11. The method according to claim 10, wherein said deposit contains a fluorine-added carbon film.